

throughout the year. This he does by dividing the year into 13 months of 28 days (or 4 weeks) each; and as that would reduce the whole year to 364 days, he proposes two intercalations, one of a zero day, and another of what he calls a double zero day.

Plans of this kind would, if adopted, cause more trouble than they would save, besides interfering with the perpetual succession of the seventh day of the week. In endeavouring to adjust the ecclesiastical calendar according to his system, Señor Hesse gives at the end a table of the dates of the feasts in 1912 as now regulated and as proposed by him. They are, indeed, inadmissible. As to taking Easter a week later, that is of less consequence; but he puts Pentecost (Whit Sunday) 54 days after Easter and 13 days after Ascension Day!

It is to be hoped that some day the whole Christian church will come to an agreement to take Easter always on the first or second Sunday in April, adjusting the other movable feasts thereby. But as regards the days of the week and year, it would be a great mistake to tinker with them; and so-called zero days would produce most serious confusion.

It is a remarkable thing that the apocalyptic book of Enoch makes the year contain only 364 days, though it must have been known, according to any probable date of the composition of even its first part, that the integral number was 365. That, not being a multiple of 52, we must adjust the days of the week as we can. To increase the number of the months would be deplorable from many points of view. It would have been better if Julius Cæsar's first proposal about the respective lengths of the twelve months had been retained rather than the subsequent modification of Augustus; but to alter this now would give much more trouble than it would save. W. T. LYNN.

### NOTES.

THE paper by Captain Tilho on the French mission to Lake Chad, which was read before the Royal Geographical Society on Monday evening, February 21, contained much interesting information about the hydrography of the Chad region. On arriving in the vicinity of the lake in 1908, the mission learned that caravans were crossing on dry land the northern portion of the lake-bed, where in 1904 Captain Tilho had navigated an open expanse of water; that the central portion was merely a marsh; but that in the southern portion channels which had formerly been closed to navigation had again become practicable. Summing up the results of the mission's investigations, Captain Tilho described Lake Chad as a closed depression about four-fifths the size of Belgium, entirely independent of the rivers that flow into the Atlantic and the Mediterranean. The average depth of the lake is 5 feet. Its shores are ill-defined, the slope being so slight that small variations in the level suffice either to submerge or to leave bare large areas of the lake-bed. Even the wind may produce these results. The waters of the lake are renewed for about a tenth part by the rainfall, and for about nine-tenths by the rivers that drain into the lake, principally the Shari and the Komadugu. Losses are due to evaporation and infiltration. In the present state of knowledge it is impossible to formulate a law governing the rise and fall of the lake, but there is no reason to suppose that it is likely to disappear. A problem which has exercised the minds of geographers is whether Lake Chad occupies the lowest part of the immense plain of which it is approximately the centre. The observations of the French mission show that to the north-east of the lake there is a series of plains of considerably lower alti-

tude. The country falls about 200 feet in a distance of less than 250 miles.

THE Rev. G. F. Whidborne, who died on February 14, aged sixty-four, was an enthusiastic amateur geologist who endeared himself to a large circle of friends. Since 1876 he had been a Fellow of the Geological Society, and for many years, as a member of council, he took an active interest in the society's affairs. He was also a member of council of the Palæontographical Society, and was several times elected a vice-president. He was interested in many lines of geological research, but devoted himself especially to the study of fossil Invertebrata. In 1883 he contributed to the Geological Society's Journal a paper on new Mollusca from the Inferior Oolite, and between the years 1888 and 1898 he published three volumes on the Devonian fauna of the south of England, included in the monographs of the Palæontographical Society. In later years he was also attracted to more general questions, and became an active member of the Victoria Institute, to the journal of which he contributed two papers. Mr. Whidborne's genial presence was always welcomed at the scientific meetings he attended, and his memory will be cherished by all who had the good fortune to be associated with him.

THE late Mr. R. Marcus Gunn, the eminent ophthalmic surgeon, devoted much of the leisure of his vacations to making a collection of fossils, which he left to the British Museum (Natural History). He worked especially in the Jurassic formations of Sutherland, and at the time of his death was engaged in the preparation of a memoir on the Jurassic flora of Brora, in collaboration with Prof. A. C. Seward, who is now completing the undertaking. He obtained many fish-remains, Mollusca, and other fossils, which form a valuable addition to the national collection. Mr. Gunn also collected from the Old Red Sandstone of Caithness, and will always be remembered for his discovery of the problematical fossil fish *Palæospondylus gunni*, which was named after him by Dr. Traquair.

THE following awards of the Mary Kingsley medal have been made by the Liverpool School of Tropical Medicine:—Mrs. Pinnock, in recognition of the services rendered to the cause of tropical medicine and sanitation by her brother, the late Sir Alfred Jones, founder and first chairman of the school; Mr. W. Adamson and Prof. W. Carter, for assistance rendered in the foundation of the school; Prince Auguste d'Arenberg, president of the Suez Canal Company, for his campaign against malaria at Ismailia; Sir William Macgregor, Governor of Queensland, for his services to sanitation and tropical medicine while Governor of Lagos; Surgeon-General Walter Wyman, head of the Marine Hospital Service of the United States, for the organisation which he has given to the service under him and for the manner in which he has always supported scientific principles in public sanitation; Sir Alfred Keogh, recently Director-General of the Royal Army Medical Corps, for the organisation which he has given to the service under him and for the manner in which he has always supported scientific principles in public sanitation. The medal for valuable contributions to the scientific and educational side of tropical medicine has been awarded to Prof. R. Blanchard, Paris; Dr. A. Breinl, director of the Tropical Diseases Institute in Queensland; Prof. A. Celli, Rome; Dr. C. W. Daniels, director of the London School of Tropical Medicine; Surgeon-Colonel King, Indian Medical Service; Prof. Nocht, director of the Hamburg School of Tropical Medicine; Prof. G. H. F. Nuttall,

Quick professor of parasitology at Cambridge University; Major L. Rogers, Indian Medical Service; Prof. J. L. Todd, associate professor of parasitology at McGill University.

By Colonel C. R. Conder's all too early death on February 16, science and geography have suffered a great loss. When still a young subaltern of engineers he was selected to continue the survey of the Holy Land under the auspices of the Palestine Exploration Fund, and he amply justified the selection. He had a natural aptitude for surveying, and he and his assistants made an excellent survey of a large area of the Holy Land. The difficulties he had to encounter were not confined to those incident to the survey of a rugged and unmapped country; to these were added troubles with Turkish officials and with the inhabitants; but his tact and genial nature, combined with the knowledge of the people and language he soon acquired, his energy and enthusiasm, triumphed over all obstacles, and enabled him to carry out the work in a manner which reflected credit on him and on his country. His service in Palestine affected the rest of Conder's life. A man of his ability and energy naturally did not confine himself to his technical survey work and to the identification of Biblical sites. He threw himself wholeheartedly into the many questions which arose in connection with this work, and applied to them a keen and ingenious intellect and an unbounded industry. The interests and studies which Conder first took up in Palestine were pursued by him to the end of a hard-working life. While in the army his official duties were often important and arduous, but he spent almost the whole of his spare time in study and literary work connected with the Holy Land, and after his retirement he devoted himself entirely to this work. Conder spent a good many years on the congenial work of the Ordnance Survey; he did good work on some of the other varied duties of the Royal Engineers, and later on under the Irish Government, but his name will be remembered mainly through his survey, his numerous books, and memoirs on the Holy Land. The views he propounded do not command universal acceptance, but they were based on hard and conscientious work, on deep study, and on intimate personal knowledge of the Holy Land, and his works have added largely to our knowledge.

CYCLONIC disturbances have for some time past continued to arrive from the Atlantic with more than usual frequency, and since the commencement of February the British Islands have been constantly under the influence of boisterous, warm, and moist south-westerly winds, which have blown from off the open ocean. Barometrical pressure has been uniformly lower in the northern part of our area than in the south. The central areas of the disturbances have passed either to the north of Iceland or between Iceland and Scotland. The storm systems became more thoroughly developed from about February 17, when a fairly severe gale was experienced in our northern and western districts. On Saturday, February 19, another important disturbance arrived from the Atlantic, and the barometer fell considerably below 29 inches over the greater part of the kingdom, accompanied by strong gales in many places. This disturbance was passing away to the north-eastward when a fresh fall of the barometer set in on our west coasts, resulting in a very severe storm over the whole country on Sunday. The barometer at 6 p.m. was as low as 28.1 inches in the north-west of Ireland, and the mercury was below 29 inches over nearly the whole of the British Islands. The barometrical gradient was very steep in Ireland and over the southern portion of England, and the heaviest winds were probably experi-

enced in the English Channel and over the North Sea, where, from the estimated strength of the wind, the rate attained fully 70 or 80 miles an hour. The wind reached its maximum strength on Sunday afternoon and evening, and the gale was particularly gusty. At Greenwich the anemometer registered 30.7 lb. on the square foot at 8.55 p.m.; but this force was not of long duration, the maximum force at other times during the gale being only about 23 lb. on the square foot. The gale was, however, one of the strongest experienced in recent years, and much damage was done both on land and at sea, accompanied by serious loss of life. Thunderstorms occurred on the night of February 20 in parts of England, and the whole character of the weather was extremely unsettled. Detailed accounts of the absolute wind velocity for various parts of the United Kingdom have not yet been received at the Meteorological Office, but the records when to hand will prove both valuable and interesting.

THE following officers have been elected for 1910 in connection with the Paris Bureau des Longitudes: President, Prof. H. Poincaré; vice-president, M. G. Bigourdan; secretary, M. H. Deslandres.

At the annual general meeting of the Physical Society, held on February 11, Prof. H. L. Callendar, F.R.S., was elected president for the ensuing year; and Prof. S. Arrhenius, Madame Curie, and Prof. G. E. Hale were elected honorary fellows of the society.

SIR WILLIAM PREECE, K.C.B., Sir Joseph Swan, and Prof. G. Vernon Harcourt have been elected the first honorary members of the Illuminating Engineering Society. The first anniversary dinner of the society was held on Thursday, February 10.

At 6.38 a.m. on February 18 a sharp earthquake was felt at Canea (Crete). The shock was accompanied by a subterranean sound and an undulating movement lasting about fourteen seconds. Several buildings were damaged in Canea and the neighbouring country. Two slight shocks were felt at Malta on the same date shortly after 6.0 a.m.

MR. A. D. HALL, F.R.S., delivered, on February 22, the first "Masters" lectures, established by the Royal Horticultural Society in memory of the late Dr. M. T. Masters. His subject was the adaptation of the soil to the plant; and he described the factors which induce a particular plant to confine itself in nature to one special type of soil, or cause a given plant to flourish in one garden while failing in another.

WE learn from the *Times* that the inhabitants of Gross-Lichterfelde, the native place of Otto Lilienthal, have decided to erect a monument to the memory of their countryman, who was amongst the earliest practical pioneers in aviation, and met his death in 1896 while making a flight at Gömberg, in the province of Brandenburg. The monument will be erected either on the hill on the slopes of which Lilienthal made his early experiments, or in the square on the bank of the Teltour Canal.

THE anniversary meeting of the Geological Society was held on Friday, February 18, when the officers were elected as follows:—*President*: Prof. W. W. Watts, F.R.S. *Vice-presidents*: Dr. C. W. Andrews, F.R.S., Mr. A. Harker, F.R.S., Mr. W. Monckton, and Prof. W. J. Sollas, F.R.S. *Secretaries*: Prof. E. J. Garwood and Dr. A. Smith Woodward, F.R.S. *Foreign Secretary*: Sir Archibald Geikie, K.C.B., Pres.R.S. *Treasurer*: Dr. Aubrey Strahan, F.R.S. The following medals and funds were presented:—Wollaston medal to Prof. W. B. Scott; Murchison medal to Prof.

A. P. Coleman; Lyell medal to Dr. A. Vaughan; Wollaston fund to Mr. E. B. Bailey; Murchison fund to Mr. J. W. Stather; Lyell fund to Mr. F. R. Cowper Reed and Dr. Robert Broom. The president delivered his anniversary address, which dealt with the antiquity of man.

THE report of the council was presented at the annual general meeting of the Institution of Mechanical Engineers on February 18. Among other matters of interest dealt with we notice that a grant of 200*l.* was made towards the cost of depositing at the National Physical Laboratory a set of British standard Whitworth- and fine-thread hardened plug screw-gauges, with other screw-gauges and measuring machines. An exhaustive research into the properties of some alloys of copper, aluminium, and manganese was completed at the National Physical Laboratory in May by Dr. W. Rosenhain, in conjunction with Mr. F. C. A. H. Lantsberry. This forms the ninth report of the Alloys Research Committee, and is now before the Institution for discussion. In view of the extremely heavy task of completely investigating a ternary system of alloys, the committee, under the chairmanship of Sir William H. White, is now limiting its researches at the National Physical Laboratory to the study of light alloys of aluminium, and is dealing, in the first place, with those containing zinc or nickel. Prof. H. C. H. Carpenter is continuing at the University of Manchester his research, referred to in the last annual report, on the production of castings to withstand high hydraulic, steam, and gas pressure. A report is expected towards the end of 1910. The summer meeting of 1910 of the institution will take the form of a joint meeting in Birmingham and London with the American Society of Mechanical Engineers. This occasion will afford members an opportunity of reciprocating the hospitality extended to them in the United States during the joint meeting of 1904.

DR. A. M. McALDOWIE read a paper before the Cotteswold Field Club on February 15 on field-notes on certain prehistoric remains near Cheltenham. The object of the paper was to show that many of the camps and barrows on the Cotteswold Hills, such as those of Leckhampton, Crickley, Coopers Hill, and others, were used in prehistoric times for observations of the rising and setting sun at the solstices and equinoxes. By the use of a series of diagrams he showed that the position of these monuments was in many cases in remarkable agreement with the solstitial lines. In the discussion which followed, the remarkable character of these coincidences was recognised, but the opinion was expressed that the suggestion that these camps and barrows were used for solar observations before they were utilised for purposes of protection and interment of the dead was improbable. The author referred to the curious custom of planting trees on barrows, possibly as homes for the spirits of the dead, and to the fact that a right of way very commonly was found to exist leading to the more important barrows, suggesting that they were scenes of assemblages for some religious purpose in early times.

WE have to welcome the first part of a new Yorkshire natural-history journal, in the form of the Proceedings, &c., of the Hull Junior Field Naturalists' Society. It contains a reprint of Mr. J. Ritchie's paper on the occurrence of the Arctic hydroid *Selaginopsis mirabilis* in British waters, and likewise of Mr. T. Sheppard's account of a specimen of the crustacean *Eryon antiquus* from the Yorkshire Lias.

THE February number of Witherby's *British Birds* Mr. E. Fagan, secretary of the natural-history branch

of the British Museum, communicates a full memoir, accompanied by an excellent portrait, of the late Dr. R. B. Sharpe. In the same issue Dr. N. F. Ticehurst records the occurrence of a pair of black wheatears, or black chats (*Saxicola leucura*), at Rye Harbour between August 31 and September 16, 1909, both of which were killed. This is the first record in Britain of this south European and north African bird.

WE have received a copy of the report of the Yorkshire Naturalists' Union for 1909, reprinted from the January number of the *Yorkshire Naturalist*, from which it may be gathered that the work of that body is being carried on as energetically as ever. We have been struck by the statement that Mr. J. F. Musham "sent a brood of young pipistrelles taken in a bedroom in the Northallerton district," since this would seem to imply (although it may bear another interpretation) that the pipistrelle may produce several young at a time. Information on this point would be of interest.

IN vol. iii., part iv., of Records of the Indian Museum, Dr. N. Annandale describes and figures, under the name of *Alaptus magnanimus*, what is apparently the smallest known insect, the length of the type-specimen being only 0.21 mm. and the wing-expanse 0.85 mm. The only known specimen made its appearance in the field of vision while its describer was engaged in observing under the microscope certain organisms in oil-of-cloves. It proved to belong to the hymenopterous family Myrmariidæ, and to be nearly allied to Westwood's *Alaptus excisus*. As the insect was unlikely to be met with by any professed student of the Hymenoptera, Dr. Annandale considered that he was not justified in neglecting the opportunity of publishing a description.

Two articles in the February number of the *Popular Science Monthly* are devoted to an account of modern work on marine biology and oceanography. In the first of these Prof. C. L. Edwards gives an illustrated description of the Swedish marine zoological station at Kristineberg, near the village of Fiskebäckshil, on the west coast. Fiskebäckshil was first brought into prominence as a promising situation for the study of marine biology in 1835, and four years later Sven Lovén and others joined the colony of naturalists who were then working with the meagre resources afforded by the place. In 1877 the Kristineberg station was founded by the Danish Royal Academy of Science at the initiation of Lovén, who became director, and held the post until 1892, when he was succeeded by his friend Hjalmar Théel. The second article, by Prof. C. A. Kofoid, is devoted to the Museum für Meereskunde at Berlin, which was opened in 1906, and is designed to illustrate everything connected with the sea and its products.

THE perennial discussion as to the homology of the columella auris in Amphibia is renewed in a lengthy memoir by Messrs. B. F. Kingsbury and H. D. Reed in the *Journal of Morphology* (vol. xx., No. 4, November, 1909). This memoir constitutes the second contribution of the authors' work on the columella auris in Amphibia, and deals with the Urodela, of which a large number of types have been studied by means of serial sections. It will probably be long before unanimity of opinion is arrived at on this difficult question, but it is satisfactory to those who have been brought up in the old faith that the columella auris of amphibians is homologous with the hyomandibular of fishes to learn that this view is supported by the present detailed investigation.



APROPOS of the article on colour-blindness in *NATURE* of January 27, Mr. C. R. Gibson has forwarded us a reprint on "An Occasional Peculiarity in My Own Colour Vision" (Royal Philosophical Society of Glasgow, 1908). On three occasions he has failed to distinguish brilliant red objects or light until the colour has been accidentally brought to his notice, when the colour appears immediately to flash into his consciousness, and he experiences a feeling of amazement that he could have been oblivious to it. There is every reason to believe that, as a rule, his colour vision is normal. If this is the case, we must conclude that there is a temporary block in the transmission of the nervous impulses from the periphery to the cortex of the brain, and that the position of the block is in the higher cerebral portion of the visual path. Bordley and Cushing have recently brought forward evidence of alterations in the field of vision for colours in cases of increased intracranial pressure due to cerebral tumours. The existence of a special cortical "centre" for the perception of colours is the subject of dispute. That there must be cortical representation of the impulses engendering colour perception is a point which need not be laboured. The problem is rather that of the dissociation, or the nature of the association, of the mechanism of colour perception with that of light and form perception in the higher levels of the brain. Evidence such as that brought to our notice by Mr. Gibson helps to elucidate this problem, though more definite evidence is obtained from cases such as one admirably reported by Dr. Edwin Bramwell in the *Review of Neurology and Psychiatry* for this month (vol. viii., February). Here a cerebral abscess secondary to bronchiectasis involved the cortex of the occipital lobe, and was accompanied by fits with a visual aura and by hemi-achromatopsia.

THE production of rhizoid-like processes from cells of *Spirogyra* filaments when growing under unnatural conditions has been recorded by several observers from De Bary onwards. Evidence has tended towards the conclusion that these are malformations, and this opinion receives confirmation in a paper, by Dr. Z. Woycicki, which appears in the *Bulletin International de l'Académie des Sciences*, Cracow (October, 1909). In this case the ill effects are attributed to the gaseous atmosphere in the laboratory. A similar formation of rhizoids was induced in cultures of *Mougeotia genuflexa*, while the injection of gas into cultures of *Cladophora fracta* produced a crop of resting spores.

It is a debated point whether modifications in plants induced by special physiological conditions can be inherited or not, and a number of experimental investigations, chiefly with lower organisms, have been made with varying results. An account of experiments with *Aspergillus niger*, carried out by Mr. K. Kominami, is published as vol. xxvii., art. 5, of the *Journal of the College of Science*, Tokyo University. The fungus was grown for several generations in a strong (6 per cent.) solution of common salt, and the cultures so obtained were compared with the cultures raised in normal media. With regard to germination, the conidia of the modified stock started more rapidly and strongly than those from the normal plants, and this superiority was maintained throughout ten generations. On the contrary, modifications of the organism produced in poisonous solutions did not appear to be transmitted to succeeding generations.

In connection with a variety of plants which have been found to irritate the skin when handled by gardeners and others, Mr. J. H. Maiden, Government botanist for New South Wales, has commenced to collect and summarise

evidence of authentic cases. In the *Agricultural Gazette of New South Wales* (December 2, 1909) Mr. Maiden deals with a number of plants—*Oenothera biennis*, L., *Hedera helix*, L., various *Primulas*, *Hyacinthus orientalis*, L., and varieties, *Thuja Douglasii*, *Agave americana*, and others—quoting specific instances of the irritation caused. He states that he has found literature relating to plants which irritate the skin—other than *Rhus* and *Primula*, which he dealt with in an earlier issue of the *Gazette* referred to—exceedingly scarce or even wanting. Mr. Maiden would be glad of references or authoritative statements as to irritation or "poisoning" caused by any wild or cultivated plants.

IN the *Bulletin International de l'Académie des Sciences de Cracovie* for November, 1909, appears a paper on the mineral alstonite, by Dr. Stefan Kreutz, in which he discusses the vexed question whether this substance is a double salt or an isomorphous mixture of the three members of the group, aragonite, witherite, and strontianite. From a careful consideration of his own and earlier observations he concludes that the second view is probably correct, but acknowledges some as yet inexplicable discrepancies. He explains the complex twinning either as simultaneous twinning about both {110} and {130} or as repeated twinning about {110}, as in the case of alexandrite.

PROF. A. WOEIKOF contributes an extremely interesting and suggestive study of the sources of human food-supply to *La Géographie* (vol. xx., Nos. 4 and 5, pp. 225 and 281). After pointing out that the substitution of any manufactured substance for vegetable food is extremely improbable, inasmuch as plant life is capable of storing solar energy in a much more economical manner than any machine, the author emphasises the facts that scarcely any one kind of food is universally regarded as a necessary of life, while many kinds which are now regarded as necessities by certain peoples were almost unknown to them a few generations ago. From an examination of the geographical and economic conditions, Prof. Woeikof concludes that meat will in the future become so expensive as to be practically unavailable as an ordinary food, and that the supply must sooner or later be drawn wholly from the vegetable kingdom. He is of opinion that the application of scientific methods will increase the productiveness of the agricultural land of the world to an almost unlimited extent.

IN the *Atti dei Lincei* (xix., 1), Dr. Umberto gives a short note on the solution of the hydrodynamical equations for two-dimensional steady motion in a region bounded by free stream lines, the remaining spaces being occupied by fluid at rest.

UNDER the title of "L'Énergie," a French translation of Prof. Ostwald's classical work has been added to the new scientific series published by M. Félix Alcan, Paris, under the editorship of Prof. Borel. The translator is M. E. Philippi, and the price is 3.50 francs.

FROM the *Annual Register* we learn that the American Mathematical Society now consists of 618 members, as against 601 at the beginning of last year. The library now contains nearly 3300 volumes, as against between one and two hundred nine years ago. The books can be borrowed through the post by members, and one of the aims of the library is to preserve as complete a record as possible of the growth of mathematics in America.

THE *Revue générale des Sciences* (xx., 23) contains a second article, by Prof. Frédéric Houssay, on the form and stability of fishes. The author has now made models

representing different kinds of fish, tapering to the tail end in the form of circular or elliptic cones, and fitted with fins and tails similar to those on the actual fishes. He finds that the short conical forms are the most stable, that stability is in every case secured by means of the fins, and that for certain limits of velocity an elongated conical form becomes unstable under the conditions existing in nature.

MANY who have had experience of magnetic survey work on land, but have never attempted observations at sea, will be interested in an article, by Dr. L. A. Bauer, in the December (1909) number of *Terrestrial Magnetism and Atmospheric Electricity* on some problems of ocean magnetic work. It deals with the arrangements adopted on board the United States survey ship *Carnegie* by Dr. Bauer. Each of the three instruments in use is arranged to determine two of the magnetic elements, and the reductions are made within a few minutes of the observations being taken, so that if there is any disagreement repeat observations may be taken at once. Recording and reducing are in every way facilitated by the use of printed forms, and results are to be published rapidly. Thus Dr. Bauer intends to give a summary of the voyage ending January, 1910, in the March number of *Terrestrial Magnetism*, and future work is to be dealt with in the same prompt fashion.

WE have received a separate copy of a paper on two mercury manometers for small pressures, by Drs. Karl Scheel and Wilhelm Heuse, of the Physikalisch-Technische Reichsanstalt, which appeared recently in the *Zeitschrift für Instrumentenkunde*. The first of the two manometers is a slight modification of the instrument described by Lord Rayleigh in 1901. A U-tube provided with a bulb on each limb is filled with mercury up to the middle of the bulbs. Just above each mercury surface is a fine glass point, an image of which can be seen in the mercury. The tube is attached to a support, which can be tilted about an axis perpendicular to the plane of the tube by means of a screw, while the angle of tilt is determined by the mirror and scale method, the mirror being attached to the support. The glass points and their images are observed through a microscope. To increase the range of the instrument, in the second form of it one of the bulbs can also be moved up or down on the support by means of a screw, and the movement measured by means of a second mirror supported partly on the fixed, partly on the moving, bulb. By means of the two instruments the authors have determined the vapour pressure of water at low temperatures to a high order of accuracy.

THE existence of a negative coefficient of expansion for silver iodide, first demonstrated by Fizeau, and confirmed by Rodwell, has not yet been explained by any satisfactory hypothesis. Grinnell Jones (*Zeitschrift für physikalische Chemie*, January 25) suggests that Richard's hypothesis of compressible atoms may have a bearing on this point. From this point of view the volume change of a substance owing to a rise of temperature is the algebraical sum of the volume changes, the increase of the intramolecular space owing to the increased molecular vibration, the increase due to the diminution of cohesion, and a positive or negative volume change owing to an alteration in the mutual chemical attraction of the atoms. In the present paper it is shown that the affinity of silver and iodine increases with the temperature, and it is suggested that it is the resulting contraction which causes the negative expansion coefficient of silver iodide.

In view of the extreme fewness of the insoluble salts of sodium, exceptional interest attaches to the observations

of Mr. W. C. Ball, as described in the *Journal of the Chemical Society* (December, 1909), to the effect that the nitrite  $5\text{Bi}(\text{NO}_2)_3 \cdot 9\text{CsNO}_3 \cdot 6\text{NaNO}_2$  is substantially insoluble in water, whilst the corresponding potassium salt is soluble. The use of bismuth-cæsium-potassium nitrite provides a reagent by means of which small amounts of sodium may be detected and estimated in the presence of large quantities of potassium—a great advance on the indirect methods that have usually been employed. The reagent is made by dissolving 50 grams  $\text{KNO}_3$  in 100 c.c. of water, neutralising with nitric acid, and adding 10 grams of powdered bismuth nitrate. To this liquid a 10 per cent. solution of cæsium nitrate is added until the sodium present in the  $\text{KNO}_3$  has been precipitated; the solution is then filtered, and the cæsium salt added to a total of 2.5 grams. The method may be varied to detect cæsium by the use of bismuth sodium nitrite as a reagent, the precipitate having the same composition as in the previous case; rubidium may also be detected, but the test is less sensitive.

THE problem of the best method of dumping stone, dirt, or other spoil into water is of particular interest in Stockholm, where rock-blasting and removal is being carried out continually for extensions to the harbour or to the streets. We learn from a note in *Engineering* for February 18 that a new form of automatic dumping apparatus has been designed and constructed by Mr. A. F. Wiking, of Stockholm. This self-dumping barge is built with a flush deck having low bulwarks on three sides, the fourth side being either left open or provided with doors which are opened by the pressure of the load on deck when the barge tilts over for dumping. The self-tilting of the barge is obtained by forcing water, by means of compressed air, into a cylindrical tank, which is carried on tripods at a height of about 16 feet above the deck. The admission of water to this tank upsets the stability of the barge, with the result that it tilts over and discharges its load. Arrangements are also provided for returning the water from the elevated tank after dumping is completed, so as to enable the barge to return to an even keel.

THE large ice-making plant recently set to work at Grimsby by the Linde British Refrigerating Company, Ltd., is described in the *Engineer* for February 18. The plant is on the ammonia compression system, and consists of two steam-driven ammonia compressors, two belt-driven treble-ram water pumps, two ammonia condensers, two can ice-making tanks and brine refrigerators, centrifugal brine-circulating pumps, electrically driven cranes, ice crushers, and elevator. There is an insulated cold store of about 13,000 cubic feet capacity, and an ice store capable of holding 1100 tons of ice, both stores being cooled by means of pipes, through which cold brine is circulated by rotary pumps. The compression plant is driven by a Morley's patent cross-compound steam engine, designed to use highly superheated steam, and is provided with exceptionally large bearing surfaces, as it has to run six or seven months at a stretch without stopping. The results of trials show 9.56 lb. weight of steam per indicated horse-power per hour when producing 208 tons of ice per day of twenty-four hours; 5.12 lb. of ice were made per pound weight of steam. The ice-making performance of the plant is about 41 tons of ice per ton of coal, a very creditable performance, which has not been approached by any other type of refrigerating machinery.

MESSRS. FRIEDLÄNDER, of Berlin, have sent us copies of seven catalogues of scientific publications, devoted, respectively, to various branches of palæontology, geography, and physiography.

MESSRS. MACMILLAN AND CO., LTD., have published the mathematical papers for admission into the Royal Military Academy and the Royal Military College for the years 1900-9 in a single volume, the price of which is 6s. The book has been edited by Messrs. E. J. Brooksmith and R. M. Milne, who have supplied answers to the questions.

A SECOND edition of "Acetylene: the Principles of its Generation and Use," by Messrs. F. H. Leeds and W. J. Atkinson Butterfield, has been published by Messrs. Charles Griffin and Co., Ltd. The original issue of the work was reviewed fully in NATURE of December 10, 1903 (vol. lxi., p. 122), and it will suffice to say that the book has been revised and enlarged, an appendix including descriptions of representative acetylene generators having been added.

THE second part of "A Catalogue of Books on Natural History" has been issued by Mr. Bernard Quaritch, of Grafton Street, London, W. The present part completes the general works, and this section includes scientific voyages and transactions of learned societies; and the works on zoology are also begun. We notice that the section of the catalogue concerned with entomology includes two important libraries brought together by authorities on the subject. It is expected that the catalogue will be completed in ten parts.

THE St. Catherine Press, Ltd., has published a handbook to the Scandinavian winter health resorts, written by Dr. T. N. Kelynack. The substance of the book originally appeared as a series of articles in the *Lancet*. The descriptions of places are written in a bright, interesting style, and indicate that Dr. Kelynack speaks from personal knowledge derived from direct inquiry and observation. Numerous illustrations add greatly to the attractiveness of the guide, which altogether should prove of value both to physicians and patients and to holiday seekers. The price of the book is 1s. net.

### OUR ASTRONOMICAL COLUMN.

DISCOVERY OF A NEW COMET, 1910b.—A telegram from the Kiel Centralstelle announces the discovery of a new comet by M. Pidoux at the Geneva Observatory. The position of the comet on February 20, at 7h. 10m. (Geneva M.T.), was R.A.=oh. 46m. 22.1s., dec.=+7° 50' 41", and the daily motion was -2.4 m. in R.A. and -24' in declination.

This position is in the constellation Pisces, the comet at the time of discovery being slightly east of north from  $\delta$ , and a little north of west from  $\epsilon$ , Piscium. Reference to the ephemeris for Halley's comet will show that, when discovered, this new object was apparently less than  $1\frac{1}{2}^\circ$  away from Halley's.

COMET 1910a.—The story of the discovery of comet 1910a is now exactly recorded, by Mr. Innes, in No. 4387 of the *Astronomische Nachrichten* (p. 311, February 12). It appears that the first intimation received by Mr. Innes arrived by a telephone message on January 15 from the *Leader*, a Johannesburg newspaper. This message stated that "Halley's comet was seen by Foreman Bourke, Driver Tricker and Guard Marais at 4h. 45m. rising in front of the sun. It was visible for about twenty minutes."

The next morning, Sunday, Messrs. Innes and Worsell kept watch, but clouds prevented an observation. The morning of January 17 was also cloudy, but there was a break just above the place of sunrise, and the comet was seen, at 5h. 29m. (standard time), by both observers independently, but by Mr. Worsell a few seconds the earlier; the telegram to Kiel was then dispatched.

Mr. Innes asks that, if seen by no one else earlier, it may be placed on record that this comet was first seen by railway officials at Kopjes, Orange Free State.

In the same number of the *Astronomische Nachrichten*

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Dr. Kobold gives the daily ephemeris, based on the improved elements, extended to March 12; the following is an extract:—

#### Ephemeris for 12h. (Berlin M.T.).

	$\alpha$ (1910.0)	$\delta$ (1910.0)	$\log r$	$\log \Delta$	Mag.
1910	h. m.				
Feb. 24 ...	22 10.9 ...	+11 55.6 ...	0.05563 ...	0.29959 ...	5.4
28 ...	22 14.6 ...	+12 53.8 ...	0.08681 ...	0.31812 ...	5.6
Mar. 4 ...	22 18.1 ...	+13 48.5 ...	0.11505 ...	0.33461 ...	5.8
8 ...	22 21.3 ...	+14 40.5 ...	0.14086 ...	0.34936 ...	6.0
12 ...	22 24.3 ...	+15 31.0 ...	0.16463 ...	0.36238 ...	6.2

The magnitudes are based on the observation made by Prof. Hartwig on January 27 that the magnitude was then about 2.0, and by calculation the magnitude at perihelion becomes about -1.4. Observations made at Arcetri on February 7 gave corrections of +2s. and +0.4' to the ephemeris places.

From this ephemeris we see that the comet is now apparently travelling, very slowly and in a direction slightly east of north, through Pegasus, and when it rises on the morning of March 3 it will be about 100' north of  $\beta$  Pegasi, a fifth-magnitude star; but observations will be difficult owing to the apparent proximity of the sun.

The ephemeris also shows that the comet is retreating from the earth and sun at the rate of about two million miles per day, approximately in the direction of the earth-sun line; the present distances (February 24) are about 185 and 106 million miles respectively.

In No. 7 of the *Comptes rendus* (February 14, p. 369) M. E. Esclançon describes some remarkable transformations which he observed to take place in comet 1910a between January 22 and 30. On the former date the nucleus was about 15" in diameter and very bright, and from each side of it, normally to the general direction of the tail, there appeared two currents of matter, nearly rectilinear near the source, but curving rapidly at some distance from it to form the tail. On January 30, however, the aspect was entirely changed, the nucleus being only 3" or 4" in diameter, and very sharply defined. The two currents of bright matter had been replaced by a circular nebulosity eccentric in regard to the nucleus; on February 9 no tail was visible. M. J. Comas Sola also communicates a paper dealing with the form of the comet, to which we hope to refer later. In a brief note M. Borrelly reports that on February 7 the comet was very faint, appearing fainter than stars of the eighth magnitude; on February 10 the magnitude was estimated as 8.5, and the comet was nearly circular, with a diameter of 2.5'.

HALLEY'S COMET.—The following is a further extract from Mr. Crommelin's ephemeris as published in No. 4379 of the *Astronomische Nachrichten*:—

	Ephemeris for Greenwich noon.			
1910	R.A.	Decl.	$\log r$	$\log \Delta$
	h. m.	° ' "		
March 1 ...	0 34.0 ...	+7 55 ...	— ...	0.2774
6 ...	0 30.2 ...	+7 57 ...	0.0397 ...	0.2779
11 ...	0 26.4 ...	+8 0 ...	— ...	0.2761
16 ...	0 22.6 ...	+8 2 ...	9.9744 ...	0.2711
21 ...	0 18.5 ...	+8 4 ...	— ...	0.2623
26 ...	0 14.2 ...	+8 5 ...	9.9017 ...	0.2492
31 ...	0 9.7 ...	+8 4 ...	— ...	0.2311
April 5 ...	0 4.9 ...	+8 1 ...	9.8297 ...	0.2069

These positions will be found plotted on the chart we gave in our issue of January 13 (No. 2098, p. 320), and during the greater part of April the comet will probably be unobservable. At present (February 24) the distances of the comet from the sun and from the earth are 116 and 175 million miles respectively, and the latter is increasing; but during the first week in March the earth and comet will again approach each other, until on March 31 the distance separating them will be but about 158 million miles.

In No. 419 of the *Observatory* (p. 105) Mr. Crommelin directs attention to the following parallelism of the election results of 1835 and 1910—both comet years—which is sufficiently remarkable to quote here:—

Parliaments of	1832	1906	1835	1910
Liberals ...	514	513	385	396
Opposition...	144	157	273	274